Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Preparation for International	)	IC Docket No. 94-31
Telecommunication Union World	)	
Radiocommunication Conferences	)	

COMMENTS

Constellation Communications, Inc. ("Constellation"), by its attorneys, files these Comments in response to the Commission's Notice of Inquiry, FCC 94-96, released May 5, 1994, ("Notice") regarding International Telecommunication Union ("ITU") World Radio Conference ("WRC") preparations.[1/]

I. Introduction

Constellation is one of the five companies who filed an application for a low-Earth orbit ("LEO") satellite system in the 1610-1626.5 MHz and 2483.5-2500 MHz bands by the June 3, 1991 cut-off date.[2/] These bands are allocated to the mobile-satellite service ("MSS") and the radiodetermination-satellite service ("RDSS") on a worldwide basis. Constellation has also participated as a member of the United States delegation to the 1992 World Administrative Radio Conference ("WARC") in Torremolinos, Spain. Constellation is

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1/ The date for filing Comments in response to the Commission's Notice was extended from June 6 to July 15, 1994. See FCC Public Notice, DA-566, released June 2, 1994.

2/ See application File Nos. 17-DSS-P-91(48) and CSS-91-013. Constellation also filed a Petition For Rule Making to establish service rules governing non-geostationary satellites in these bands which was assigned File No. RM-7771.

currently participating in the work of the Commission's Industry Advisory Committee ("IAC") and its Informal Working Groups ("IWGs"), as well as in the work of various task groups and working parties of the Radiocommunication Sector of the International Telecommunication Union ("ITU-R").

Constellation believes that the 1995 WRC will have a significant impact on the development of LEO technology, and supports the development of United States proposals to the WRC to enhance the development of a competitive MSS market both in the United States and on a global basis. Constellation expects that the IAC activities will provide a forum in which specific proposals can be developed with industry-wide consensus. In particular, Constellation believes that the proposals of the United States to the 1995 WRC should address several specific areas discussed below that will significantly assist the early development of LEO satellite systems.

II. The Report Of The Voluntary Group Of Experts

Constellation believes that the report of the Voluntary Group of Experts ("VGE") should be carefully examined before their recommendations can be incorporated into the Radio Regulations. The VGE Report is voluminous and contains numerous recommendations that range from those dealing with general matters of principle to those that are of an editorial nature. As the Commission observes in its Notice, it is important that the simplification sought by the VGE does not eliminate important safeguards or overlook specific situations requiring different treatment. For this reason, Constellation believes that it

will be important for the IAC and its IWGs to perform a detailed examination of the VGE Report and develop any necessary proposals in this regard.

In particular, Constellation shares some of the Commission's concerns regarding any replacement of the Resolution 46 coordination procedure for LEO systems with the simplified VGE coordination procedure. This procedure was specifically developed at the 1992 WARC to deal with the complexities of implementing LEO systems. Any United States proposals in this area should focus on making the coordination and notification process for LEO satellite systems as efficient as possible.

Another area of potential concern is the concept of "incorporation by reference" of ITU-R Recommendations. While "incorporation by reference" might permit more timely updating of detailed technical provisions that have been adopted by a WARC or WRC, this approach should not be used to delegate difficult decisions regarding inter-service sharing criteria to individual ITU-R Study Groups. With the current organization of the ITU-R into many working parties and task groups, there must be adequate provisions for review by all of the affected interests before ITU-R Recommendations dealing with inter-service sharing criteria can be incorporated by reference into the Radio Regulations.[3/]

3/ One example of a successful working arrangement is the joint Study Group 4/9 activities dealing with sharing between the fixed and fixed-satellite services. Situations involving sharing between the MSS and other services are more difficult. Although the ITU-R's Task Group TG-2/2 is currently attempting to develop sharing criteria in the 1-3 GHz portion of the spectrum, it is not clear that this work can be fully accomplished within its current schedule, and follow-up work in individual study groups may not allow the necessary interplay between the affected services.

III. Enhancement Of The MSS/RDSS Allocations At 1610-1626.5 MHz And 2483.5-2500 MHz

As a pending applicant for a LEO satellite system in the 1.6/2.4 GHz MSS/RDSS bands, Constellation has a vital interest in enhancing the current regulatory provisions governing the establishment of new satellite systems in these bands. There are two aspects of the current provisions governing these bands that warrant change to improve their utility for LEO satellite systems. These areas involve (1) footnotes RR731E and RR733E, and (2) use of RR2566 as the coordination trigger value for the application of Resolution 46 in the 2483.5-2500 MHz band.

RR733E currently provides that "[h]armful interference shall not be caused to stations of the radio astronomy service using the band 1610.6-1613.8 MHz by stations of the radiodetermination-satellite and mobile-satellite services." This footnote was initially adopted at the 1987 WARC at the time RDSS was allocated to the table of allocations and radio astronomy had only secondary status under RR734. It was limited to Regions 1 and 3 where RDSS is a secondary service except in those countries specifically listed in RR733B.[4/] Even though radio astronomy was upgraded to primary status in the Table of Allocations at the 1992 WARC, RR733E was somehow retained and the restriction of this footnote provision to Regions 1 and 3 was removed. However, the retention of this provision, which is tantamount to reducing MSS and RDSS to secondary status,[5/] is in direct contradiction with the inclusion of MSS as a primary service (along with radio astronomy) in the table of

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4/ See Final Acts of the 1987 WARC.

5/ See RR420-423 for the definition of a secondary service.

frequency allocations. The same problem is also created with respect to the fixed service[6/] and the aeronautical radionavigation service[7/] by the last sentence of footnote RR731E.

These provisions are likely to create difficulties and confusion in the application of any coordination procedure between LEO MSS/RDSS systems and the other services in these bands. This apparent contradiction between the primary table status of MSS and the footnote text should be eliminated by suppressing footnote RR733E and the last sentence of footnote RR731E.[8/]

Footnote RR753F requires coordination of MSS space stations with terrestrial services if the power flux density ("PFD") exceeds the limits specified in RR2566. These values of PFD vary between -142 dBW/m^2-4 kHz for elevation angles of 25° and higher, and -152 dBW/m^2-4 kHz for elevations of 5° and below, with linear interpolation for elevation angles between 5° and 25°. Because LEO systems operate on a global basis, it is highly desirable to set the coordination trigger value at a PFD level that can be met by operational LEO systems to avoid the need for coordination with terrestrial services in every country of the world.

6/ RR730 provides a footnote allocation to the fixed service in certain specified countries.

7/ This includes the Glonass system operated in accordance with RR732.

8/ It should be noted that RR734 could still be retained to recognize the importance of this band to radio astronomy. In addition, RR953 continues to recognize the special characteristics of radionavigation services.

Constellation is currently designing its initial system to operate at the -142 dBW/m^2-4 kHz PFD within its service area.[2/] However, Constellation is considering its service area as being defined by a 15° to 20° elevation angle to a subscriber located at the edge of coverage. Using such a 15° to 20° elevation angle to define edge of coverage provides a reasonably high elevation angle to overcome local obstructions to the subscriber's line-of-sight to the satellite while keeping the total number of satellites needed to provide global coverage at a reasonably economical value. If Constellation's satellites were to be designed to satisfy the RR2566 PFD limits in the 15° to 25° elevation coverage area, its subscribers would be subjected to excessive levels of interference from other LEO satellites. This situation would occur when an interfering satellite appears at the subscribers' locations at elevation angles of 25° and above and transmit at the -142 dBW/m^2-4 kHz PFD permitted for these higher elevation angles, while the Constellation satellite appears to the subscriber at an elevation angle below 25° and its PFD is constrained by RR2566 to a lower value.

Constellation believes that LEO MSS systems should be allowed to operate at a -142 dBW/m^2-4 kHz PFD at elevation angles of 15° to 20° and above without having to coordinate with terrestrial services under Resolution 46. This can be accomplished either by extending the edge of the -142 dBW/m^2-4 kHz PFD plateau from 25° down to the 15° to 20° range, or by increasing the maximum PFD level for elevation angles above 25° to the point where a -142 dBW/m^2-4 kHz PFD is permitted for elevation angles of 15° to 20°.

2/ Constellation would support a modest increase in the PFD level to provide capabilities for increased system capacity in the future. However, if several LEO MSS systems operate in the band under an interference sharing arrangement, the systems will still have to agree on a common aggregate system PFD level irrespective of the specific PFD level specified as a coordination trigger for coordination with terrestrial services. See Attachment 1 to Annex 1 to the Report of the MSS Above 1 GHz Negotiated Rulemaking Committee, April 6, 1994 in CC Docket No. 92-166.

IV. The 2 GHz MSS Allocations

One of the difficult issues addressed by the 1992 WARC was the allocation of bands on worldwide basis for future personal communications services.[10/] The approach made provisions in the 2 GHz portion of the spectrum for both terrestrial and satellite technology to be employed for these new services. In RR746A, the 1992 WARC identified the bands 1885-2025 MHz and 2110-2200 MHz for terrestrial systems, and allocated the sub-bands 1980-2010 MHz (plus 1970-1980 MHz in Region 2) for MSS uplinks and 2170-2200 MHz (plus 2160-2170 MHz in Region 2) for MSS downlinks. RR746B provides that the use of the 1970-2010 MHz and 2160-2200 MHz bands for MSS "shall not commence before 1 January 2005" except that RR746C allows the use of this band for MSS in the United States on 1 January 1996.

Constellation is convinced that LEO satellite systems will play a vital role in the development of new personal communications services on a national and global basis. The 2 GHz MSS bands are a critical element of the expansion of the LEO MSS proposed in the 1.6/2.4 GHz MSS/RDSS bands as well as the implementation of additional MSS systems. However, the Commission recently decided to allocate portions of these bands to terrestrial personal communications services.[11/] In allocating the 1850-1990 MHz band to these new services, the Commission has effectively eliminated the use of the bottom 20 MHz of the international MSS allocation at 1970-2010 MHz by future MSS systems.

[10/] These services are characterized by the ITU term "future public land mobile telecommunication systems" ("FPLMTS") in the Final Acts. See e.g., RR746A.

[11/] See Memorandum Opinion and Order in Gen Docket No. 90-314, FCC 94-144, released June 13, 1994.

LEO MSS systems are inherently global in nature and thus require global allocations. For this reason, Constellation believes that the Commission should seek the enhancement of the 1992 WARC 2 GHz spectrum allocations in order to accommodate LEO MSS growth requirements after the 1.6/2.4 GHz bands are fully utilized.[12/] Constellation believes that this goal can be best accomplished by building on the 1992 WARC Final Acts at the 1995 WRC. In particular, Constellation believes that the United States proposals with respect to these bands should focus on (1) making a minimum of 40 MHz of uplink and 40 MHz of downlink MSS spectrum available on a world-wide primary basis by expanding the 10 MHz of Region 2 MSS into Region 1 and 3 primary allocations, and (2) making the MSS spectrum globally available by 1996. In doing so, it will be also be necessary to move the existing spectrum allocated by the ITU to MSS at 1970-1990 MHz in order to avoid overlap with the Commission's recent Personal Communication Services allocation plan.

V. LEO MSS Feeder Link Bands

Constellation is proposing to use the 5150-5216 MHz and 6525-6591 MHz bands for its feeder links because these bands are already allocated for RDSS feeder links. The Commission has since indicated that the 5 GHz band may not be available for MSS feeder links because of the opposition of the Federal Aviation Administration ("FAA").[13/] Although

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12/ Constellation is not taking any position at this time as to whether a total of 80 MHz (40 MHz uplink and 40 MHz downlink) is sufficient to satisfy all future MSS requirements. This question is currently under study in the IAC IWG-3.

13/ See e.g., Notice of Proposed Rule Making, CC Docket No. 92-166, 9 FCC Rcd 1094 (1994) at para. 75. However, the FAA recently announced its plans to cancel future development of the microwave landing system, which is the primary usage of this band. See Washington Post at B1, June 3, 1994; "FAA Halts Development of Microwave Landing System, Cancels Contracts," FAA News Release, FAA 17-94, June 2, 1994.

Constellation believes that the 5 GHz band remains a desirable option for LEO MSS feeder links, consideration of other bands appears to be a prudent and necessary course of action at this time.

Constellation has also indicated that its feeder link requirements are likely to be increased in order to implement an interference sharing plan among the CDMA applicants.[14/] In addition, the Ka-band fixed-satellite service bands, which the Commission indicates may be the only feeder link bands available, are undesirable for LEO satellite systems. This is particularly important for Constellation's system which is designed to support multiple gateways within an earth coverage feeder link antenna beam. However, Constellation has also indicated its concerns that all LEO applicants have equal access to the Ka-band portion of the spectrum, particularly in light of the different sharing conditions that might exist in different parts of these bands.[15/]

Constellation believes that it is necessary to identify LEO system feeder link bands which are not subject to the requirements of protecting satellites in the geostationary satellite orbit ("GSO") under the provisions of RR2613. This is one reason that Constellation considers the RDSS feeder link bands so desirable because there is little if any GSO systems in these bands.[16/]

14/ See Comments of Constellation Communications filed May 5, 1994 at Appendix C in CC Docket No. 92-166.

15/ Id. at 57-59; Reply Comments of Constellation Communications, Inc. filed June 20, 1994 at 55-61.

16/ The RDSS feeder link bands requested by Constellation for its system are in the C-band portion of the spectrum which make them highly desirable because of their favorable propagation characteristics.

Constellation is currently of the opinion that the United States proposals to the 1995 WRC should seek to identify a minimum of 200 MHz of uplink and 200 MHz of downlink spectrum for priority use (i.e. without the RR2613 requirements) in each of the C-band, Ku-band and Ka-band portions of the spectrum for LEO MSS feeder links. Such a result should allow all of the pending LEO MSS applicants sufficient flexibility to implement their systems without excessive impairments or increased costs. Given the congestion of most of the currently allocated fixed-satellite service bands, Constellation supports the study of reverse band working as a matter of high priority as a possible means of satisfying the requirements for LEO MSS feeder links. Constellation is not currently making any specific band proposals, but will participate in the activities of IAC IWG-4 to develop specific proposals in this regard.

VI. Conclusion

Constellation supports the Commission's establishment of its IAC to develop proposals for the 1995 WRC. Constellation intends to actively participate in the activities of these groups, as well as related ITU-R preparatory groups, to develop specific proposals to the WRC. Although it is likely that these activities will result in a comprehensive set of proposals dealing with the MSS, Constellation believes that there are several items that can be identified at this time as priority items for which United States proposals will be needed.

In order to enhance its ability to promptly implement its LEO MSS/RDSS system, Constellation believes that footnote RR733E and the last sentence of footnote RR731E need to be deleted, and that the application of RR2566 as a coordination trigger in the 2483.5-2400 MHz band needs to be modified as described above. Constellation also believes that it

is critical that at least 200 MHz of uplink and 200 MHz of downlink in the C-band portion of the spectrum be identified for LEO MSS feeder links on a priority basis without any obligations to protect GSO use of the bands under the provisions of RR2613. Finally, Constellation believes that the 1992 WARC 2 GHz MSS allocations should be enhanced as described above to allow for the expansion of the initial 1.6/2.4 GHz LEO MSS systems and the development of additional satellite-based personal communications services in the future.

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CERTIFICATE OF SERVICE

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